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THE TIE-HEEL WASH OFF

April 1936



Wash-off Service
Department of Culture

Washington, D. C.

STATE COORDINATOR'S MESSAGE

This is the beginning of the third spring season of the Soil Conservation Service in North Carolina. Since operations were started by the Soil Erosion Service twenty-seven months ago in the Deep River Valley of Guilford county, a great many changes have taken place in the Service. Thousands of farms have benefited by the erosion-control work of this program (elsewhere in this publication is a report of the outstanding accomplishments of the Service). Starting out with one demonstration project of 138,000 acres in the Deep River Valley, during the past two years the program has expanded to take in the whole Piedmont region. Although at this writing there are only eight demonstration areas and twenty CCC camps devoted to erosion-control work, formerly there were twenty-three camps.

The work of the Service has been varied and comprehensive, covering every phase of controlling erosion. Every field of agriculture has been found to be affected by erosion; consequently the erosion-control program, aimed at solving the erosion problem, has touched every branch of Carolina farming. Two years of practical experience has taught us that there is a multiplicity of methods and means of thwarting rainwash. Mechanical methods, such as terracing, diversion ditches and outlet structures, are effective and necessary for controlling erosion under certain conditions; but of far greater importance is a proper cropping system. Vegetative methods have proven to be

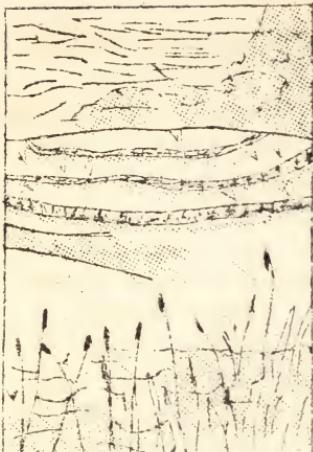
the most permanent and cheapest process in land conservation.

As we begin our third planting season in the Deep River Valley, we can think of no better advice to our cooperators than this: plant as much close-growing crops as you can economically afford. Remember that leguminous crops do three important duties. They control erosion, increase the fertility of the land and produce the best type of hay known to the dairy industry. Close-growing legume crops retard run-off, add humus to the soil, which makes it porous so that it will hold more water and conserve moisture longer, add much-needed nitrogen to the soil, thereby making it easier to work. What greater weapon to be used in this fight against erosion could be desired?

Another bit of advice to the operator is that you should get out your agreement and follow it closely in planning your crops. That agreement calls for carrying out a program that you helped draw up in cooperation with the agreement man of the Soil Conservation Service. It should serve as a sort of blueprint, which if properly followed will serve the purpose for which it was designed, i. e., to control erosion and improve the fertility of your soil. Remember also that if there are points which you do not understand, the contract man of the Service will be glad to "iron out" the difficulty with you.

J. H. Stallings.
State Coordinator

RAINFALL VS EROSION CONTROL



The severest winter in North Carolina since the war winter of 1917-18 has just come to a close. In spite of the unlocked-for severity of the weather, the terraces constructed by the Soil Conservation Service on 10,000 acres in the Deep River watershed have successfully withstood the rigors of the past few months.

J. P. Molen of the U. S. Weather Station at the Greensboro Airport reports that the rainfall from November of last year to March 15 of this year was 18.86 inches.

There were ten snowfalls, with a total depth of twenty-three inches. This was equivalent to a precipitation of 1.83 inches, giving a total of 19.89 inches for the four and half months.

January was the wettest month, with a total precipitation of 8.08 inches, while the hardest rainfall came on January 18 and 19 when 3.06 inches fell in twenty-four hours.

These unusually humid conditions, explains J. A. Muncey, Chief Agricultural Engineer of the Service, saturated the ground far below the usual saturation point. In addition, the severe cold left ice in the terraces that would not flow off. These two

conditions, in combination, placed a strain on the terraces far greater than the engineers had counted for at the time of construction.

In spite of the adverse circumstances, Mr. Muncey reports, less than two per cent of the acres in the Deep River Watershed treated by terracing were affected by terrace breaks, and a large percentage of these breaks was not due to faulty design or construction but to failure of the farmer (property owner) to make the necessary fills.

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THE AGRONOMIST SAYS

When a crop rotation is established on a field, more vegetative growth results, which not only aids in controlling erosion, but also improves the fertility of the soil. In North Carolina experience has taught us that a successful erosion control program will include close-growing vegetation as a most effective weapon, the one used by Mother Nature herself to control rainwash.

A practice of strip rotation on each field has proved to be an effective method of checking erosion. For example, a six-acre field may be divided into three two-acre sections and a three year rotation practiced. Popular crops for this rotation would be corn, two acres; small grain, two acres; and lespe-deza, two acres. Corn should follow lespedeza, small grain should follow corn and lespedeza should follow small grain.

LESPEDEZA AND WILDLIFE

This past winter has given positive demonstration of the value of lespedeza in wildlife conservation. Although the weather has been the coldest in many years, accompanied by heavy and frequent snowfalls, sportsmen have reported more quail than in any recent year.

Within the Deep River Watershed project, in the vicinity of High Point, lespedeza had been sown in badly eroded and gullied areas to check further ravages of the gullies.

During the recent cold wave, several covies of quail were found living in this lespedeza. Where once they had flown over this land, then barren and uninviting, they had, this winter, stopped. The nourishing seed of the legume had furnished them with just the type of food they wanted and the close-growing crop had furnished them adequate shelter.

Wildlife experts have been worried over the increasing shortage of wildlife in North Carolina. The song birds have been growing fewer. Insects and such undesirable animals as mice are thriving because the birds who use them as food, thereby helping us in our control of this farm menace, have no longer been stopping with us. And the visits of the game birds have been growing rarer each year, thereby depriving us of much seasonal sport.

Agronomists of the Soil Conservation Service are extolling the virtues of lespedeza as a soil improvement crop. Erosion experts say that it is the best natural erosion control yet discovered. And now Mr. Ross O.

Stevens, head of the Wildlife Department of the Soil Conservation Service for the southeast, brings this same lespedeza into his wildlife conservation program as a result of this winter's demonstration.

Badly gullied land, if left unchecked, is a constant menace. The active gullies, unsatisfied with the damage they have already done, eat deeper and deeper into the good land, making a constantly increasing acreage unfit for cultivation. Lespedeza checks this gully growth effectively, as experiments have shown.

This past winter has also demonstrated, at the same time, that lespezeza is supplying the needs of the wildlife traveler. By increasing the use of this legume on the land erosion has laid waste, the farmer is doing more than protecting the land that is in good condition. He is adding music, insect control and sport to his farm.

LESPEDEZA

(Apologies to Longfellow)

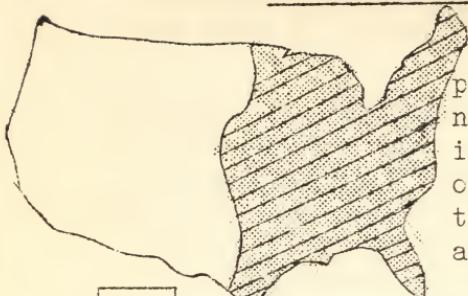
The shades of night were falling fast,
When by my kitchen window passed,
A quail, who bore, 'mid snow and ice,
A banner with the strange device:

Lespedeza!

"But wait! Leave not thy home," I cried
"I love thee so, on toast or fried."
He shook his head; I heard him moan
"Ah, friend, if you had only grown
Lespedeza!"

"The ragweed's gone; so is the grain;
For days I've felt starvation's pain.
Since I must eat to live, I go.
Next time I hope that you will sow
Lespedeza!"

LIME AND EROSION CONTROL



Lime, used in the past principally as a reagent to neutralize the acid condition of the soil, has taken on added importance as another factor in the fight against soil erosion.

Lime not needed. Lime is a valuable aid in enriching the soil through Lime needed. the addition of calcium and magnesium. This enrichment makes for a thicker and stronger crop growth. This growth holds the topsoil on the land and keeps the soil from washing away.

The advantages are two-fold. The stronger crop growth both helps to hold the valuable topsoil in place and also increases the revenue of the field. The increased yield enables the farmer to keep the revenue from his row crop acreage. He can use the added land thus made available for the growth of leguminous crops, for pastures or for orchards.

On an experiment farm in North Carolina it was found that lime, when used with legumes in a rotation, increased the yield of the crop materially. Corn grown after clover that had been limed produced a much larger yield than where no lime was used.

Due to the humidity the tendency of all soils in this state is toward acidity. As soil acidity has been discovered unfavorable in a greater or lesser degree to nearly all cultivated plants, lime is still needed as well for its neutralizing effects.

STRIP CROPPING TO STOP EROSION

The practice of strip-cropping is one of the most effective means of controlling erosion, the Service has found during its two years in North Carolina. It is a simple practice requiring no extra cost and farmers are urged to adopt it more extensively when they plant their Spring crops this month.

A type of strip-cropping that has proven its value in checking the spread of erosion follows:

Contours should be run with the same vertical fall as the terraces. On each side of this contour plant six or eight rows, depending on the slope of the land. The area astride alternate contour lines between the strip of row crops should be seeded to some close-growing crop, such as lespedeza or small grain.

Under this system, all row crops are approximately on the contour, giving them somewhat the effect of terraces in carrying off the water. Heavy wash on the area off the contour is checked by the close-growing, deep-rooted crop.

The strip planted in corn this year should have small grain and lespedeza on it the following year. Where the lespedeza is growing this year, corn or cotton should be planted the next. This strip-cropping, therefore, is also a crop-rotation plan, with the land receiving tonic of soil improvement growth in rotation with the soil depleting row crops.

The contour can be maintained by a back or dead furrow. Under a three year rotation, every other strip will be a row crop for two years, while, the third year, the whole field will remain in close-growing crop.

METHODS OF PLOWING TERRACES

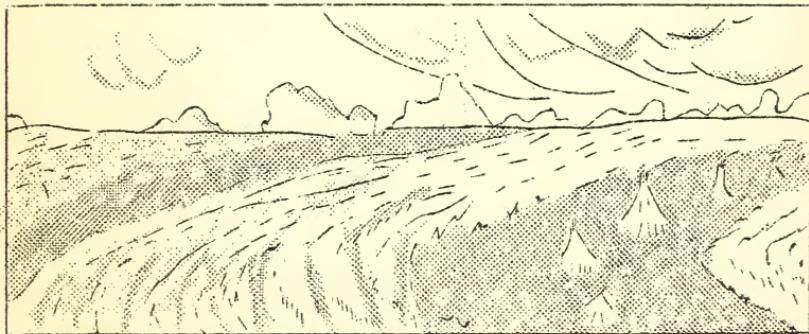
The upkeep of terraces has always been a problem of great importance to the farmer. A terrace that has its channel filled with soil has little or no value as a means of controlling erosion. To rebuild terraces involves a large and unnecessary expenditure. Consequently, we should "keep a close eye" on our terraces and see that the channels are in condition to carry the water off the field and that breaks, if they occur, are fixed immediately. Often only a few minutes work is required to fix a slight break or a low depression, which if left alone will lead to serious results. We should not forget that there are certain obligations which the cooperator must carry out for his own good.

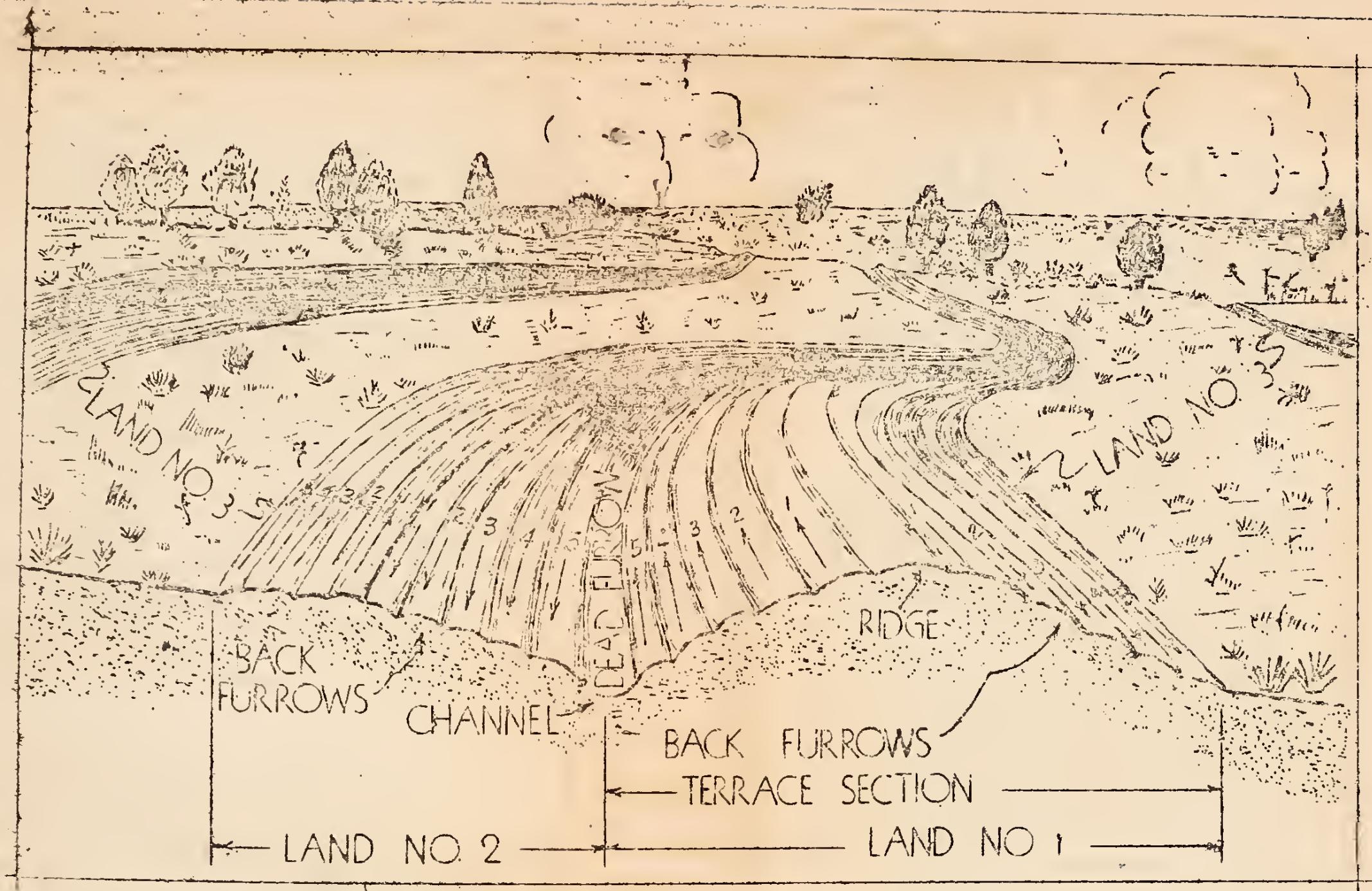
One of the most important phases of terrace upkeep is proper plowing of the terrace. If we plow across the crest without regard to the direction of the furrows, there will be an excellent chance for the channel to become filled. The furrows will doubtless soon become gullies, as they are run down the slope instead of on the contour. Realizing the importance of terrace upkeep, the Soil Conservation Service, after considerable experimentation on the subject, offers a system of plowing terraces that has been found to be the best means thus far used for plowing terraces.

The recommended method is as follows: Land #1 takes in the area from the base of the channel to the lower side of the terrace. In this land start the back furrow at the terrace ridge, throwing all the rows toward the ridge.

Land #2 includes the area twice the width of the distance between the bottom of the flow line and the beginning of the terrace on the upper side. In this land start the back furrow six to ten feet above the channel, throwing all rows uphill out of the channel. The remaining unbroken strip can be broken as a separate land. Land #2 must be varied from year to year to prevent building a ridge above the channel. The dead furrow will be in the bottom of the terrace channel.

Another method, which is optional with the Service, suggests that the plowman start the back furrow at the terrace ridge, throwing all rows toward the ridge. Continue plowing until approximately midway between the terraces, the remaining areas to be plowed as separate lands. The finishing furrow should be varied by listing more to one side than the other from year to year to prevent low places forming between the terraces. This method will have a tendency to fill up the channel, and after breaking, it may be necessary to brush out the channel with a light grader or home-made drag.





METHOD OF MAINTAINING TERRACES BY PLOWING

1. Land #1. Start back furrow at terrace ridge throwing all rows toward ridge.
2. Land #2. Start back furrow 6' to 10' above channel throwing all rows uphill out of the channel.
3. Land #3. The remaining unbroken strip can be broken as a separate land.

NOTE: Land #2 must be varied from year to year to prevent building a ridge above channel.

EDITORIALS

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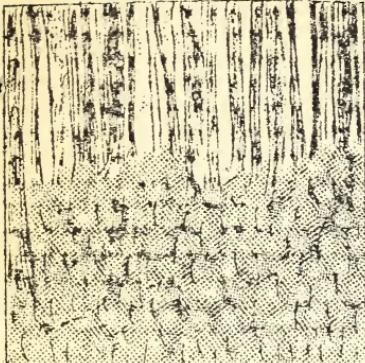
STATE COORDINATOR - Dr. J. H. Stallings
EDITOR - Forney A. Rankin

ON SANCTITY OF CONTRACTS

There are certain obligations which the cooperators of the Service entered into when they signed their agreements which, if not properly carried out, will greatly impede the progress of the erosion control program. There are also certain other "unwritten" obligations which the farmer owes it to himself and to his government to carry out. This last point concerns the farmers obligation to see that terraces are kept in proper condition, that outlets are in repair and that he do his utmost to control erosion by his own effort, such as the construction of diversion ditches, etc. To carry out the written agreement in all its specifications should be the aim of every cooperator.

April, 1936

EROSION CONTROL THROUGH FOREST



Less than five years ago, the farmer looked upon his forests solely as a source of fuelwood, timber products and game. Recent soil erosion researches, however, have indicated that forests are much more than that, that they are the most permanent means of controlling and preventing erosion.

Erosion has become such a serious problem in North Carolina and its growth has been so rapid and extensive that the farmers of the State, if they would continue to prosper, must take advantage of every natural and mechanical factor that has been proven effective in checking this spread.

Therefore, the farmer should look to his timber stands as well as his Spring plowing at this season in order to assure for himself the continued productivity of his cultivated fields. It is not too late to plant young trees on erosive land that should be retired from cultivation and thus secure an adequate stand of timber trees to meet the demands of erosion control.

The layer of humus on forest ground absorbs many times its own weight in water. This gives the rainfall gentle penetration into the soil. It does not beat upon an unresponsive surface and wash rapidly off, carrying with it much of the valuable top-soil. Roots of the trees act as miniature

check dams and allow the water to percolate through the ground.

Our State Agricultural Experiment stations have conducted tests recently that give startling proof of the value of forests in thus checking erosion. They have proved that, when rain falls on a bare field, thirty to forty per cent of the water runs off, carrying with it as much as forty tons per acre of our best soil. When the same rain falls on a forested area, however, less than one per cent of the water runs off and less than four-hundredths of a ton of soil per acre is carried away.

In addition, bodies of timber, through their absorption of water and subsequent release of moisture upon the atmosphere, tend to decrease the drying effect of winds. This helps to reduce extremes of weather conditions, which also play an important part in soil erosion.

According to the recommendations of the Soils Department of the Service, all land with a slope of 13% or more should be retired from cultivation and put to pasture or forest. Certain soil types, such as Georgeville Stony Loam, because of their physical and chemical make-up and their high susceptibility to erosion, are not adaptable to profitable cultivation and should also be retired to trees.

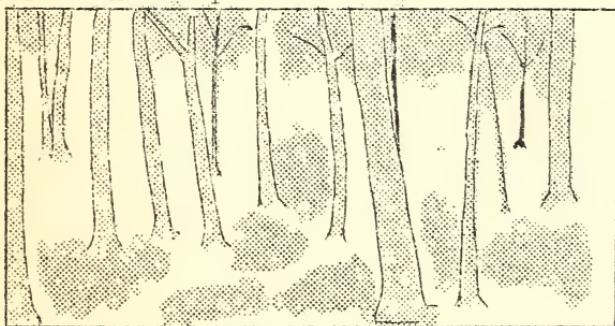
In addition, all waste, idle and abandoned land, if converted to forests, add to the appearance of the farm, increase the weapons the farmer has at hand to fight erosion and add to the source of revenue from timber sales.

On forest land that already has a satisfactory growth of trees, the Service recommends the following simple precautions, in order that the farmer may reap the full benefit from his timber stand:

When cutting for fuel-wood, take out only the poorly formed, injured and diseased trees of the better species and all the inferior species. Leave the better species that are in good condition to grow to a merchantable size.

To improve the growth and condition of the stand, thin your forest by removing the old, mature trees, injured and diseased trees and trees of undesirable species whether or not you need the timber for your immediate fuel needs.

The last but most important advice, from the standpoint of erosion control, is not to allow pasturing in your woodlands and protect them from fire. Livestock packs the soil, thereby reducing the good effects of the forest humus and they destroy the under-brush that ordinarily would help check the surface run-off during a heavy rain. Fire is the greatest destructive agency to wood lands and must be kept out at any time to assure maximum production.



WHY "WASTE" WORTHWHILE "WEEDS"



Most of us have a loathsome aversion toward weeds. Killing out weeds in a clean-cultivated crop is a tough job and often causes us to lose our mental control. Yet, there is something good even in weeds. They have a definite value as an agent of erosion-control, as well as in restoring the fertility of soil.

Experimental test of such weeds as cockleburrs, pigweeds, muletail, sunflower and rosin weeds show that they are higher in calcium and phosphorus content, and about 2% of the total chemical content is nitrogen. Smartweeds, horse weeds and wild flax also are high in calcium, phosphorus and nitrogen and thrive well on most lands.

The Service is by no means advocating cultivating weeds as crops. Cooperators are advised, however, not to burn weeds in old fields that have been thrown out of cultivation. They are too valuable in retarding rainwash; they add organic matter to the soil, as well as fertilizing ingredients, as stated above. And weeds will grow on soils that contain practically no plant food, and their continuous growth produces a marked influence on the availability of mineral matter in the soil. On the other hand, if the weeds are burned off the land will be left "open" to the ravages of rain. Fire also destroys a great amount of the humus and valuable bacteria in the soil.

But weeds have more disadvantages than those above mentioned, and there is the rub! First of all, they do not take nitrogen from the air; second, there is always danger of introducing noxious weeds which may interfere with future crop production; third, they are of very little value for pasture; and fourth, they just don't look good anyhow.

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SPRING GULLY CONTROL

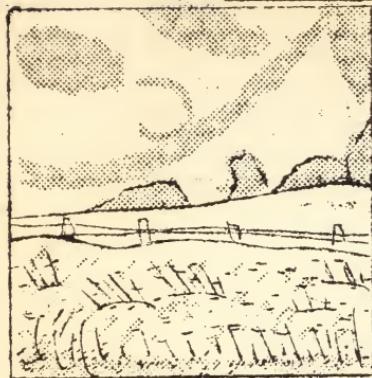
The presence of an active gully on a farm is a constant source of danger to the fertile, productive fields. If the operations of the gully are not checked, it will continue to eat deeper into the farm, dragging the good soil down its banks.

Temporary check dams and basket dams hold back the active wash but a crop of lespedeza on the banks and in the channels "kills" the gullies or stops the wash before it reaches the home-made dam structures.

Consequently, the farmer should turn his attention to his gullied areas as well as his productive fields at this time when he is sowing his Spring crops. The efforts he expends in sloping the banks of his gullies and loosening the soil for the planting of lespedeza will be amply repaid in the future.

The gully will have lost its threat to eat away the fields upon which he is depending for his revenue and once unsightly, idle lands will have a permanent vegetative cover that will supply sufficient food and shelter for wildlife.

PASTURES IN EROSION CONTROL



With the livestock shortage in North Carolina acute (Government figures released the first of the year show this State is supplying less than half of its necessary meat and dairy supplies), the agronomy department of the Service asks that farmers give the livestock problem greater consideration in their Spring plans.

A lack of good pastures has been one of the greatest drawbacks to livestock development, for increased milk production and livestock health, pastures should have good, fertile soil and the continued young growth of such plants as orchard grass, Kentucky Blue grass, white Dutch clover and lespedeza.

As this growth is also of proven value in soil erosion control, the farmer with a well-equipped pasture is solving two problems at the same time.

The Service recommends the establishment of pastures on hillsides that are too steep for growing row crops. The tendency of the soil to wash off these steep hillsides is great and continued use of this land for row crops will result in such deterioration that the land will soon be unfit for profitable cultivation, anyway.

Farmers are advised to hold their cattle to light grazing in the beginning, al-

lowing them to use the pasture only during a short period each day for the first few days, to avoid bloating and other digestive troubles.

After that, they may remain in the pastures at all times during the day, provided the land is not wet.

Overgrazing should be avoided, as it stunts the growth of the pasture crop and prevents the proper root development, thus mitigating the crop's value in erosion control.

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CONTOUR FURROWING IN PASTURES

As an erosion-control measure contour furrowing holds a prominent place, particularly when used in pastures or badly eroded fields. It means the throwing up of furrows following the contours of the land. If the area is badly cut up with gullies from six to eight inches in depth it is best to close the furrows at the edge of the gullies. But if the field has only shallow depression the furrows may extend across them, providing the base of the furrow is kept level.

The fundamental purpose of contour furrowing is to stop the washing of soil and to irrigate the land. The contour furrow accomplishes this aim in different ways: by having a level base the furrow will not allow the water to wash down the hillsides, but will hold it and distribute it regularly over the field. The water is thus given time to soak into the soil. By taking the water out of the gullies, grass and other erosion-resisting crops are given a chance to grow. As time goes on that land will again become tillable and will produce valuable pasture.

A REPORT



Two thousand eight hundred and forty-four farms in North Carolina, with a combined total of 307,458.73 acres, have already benefited by the soil erosion control work of the Soil Conservation Service.

 On these farms already under agreement, 8,991.73 miles of terraces have been constructed, protecting an area of 29,326.10 acres.

Much work has also been completed in improving these terraces. Seven thousand seven hundred and ten permanent and 11,961 temporary outlet structures have been completed; 2,145,-
 $021\frac{1}{2}$ square yards of terrace outlets have been seeded and sodded, and 1,112,627 linear feet of terrace outlet channels have been completed.

The work of gully control has gone forward with equal despatch. Sixteen thousand two hundred and one temporary and 211 permanent dams have already been constructed, while 503,490 square yards of gully banks have been properly sloped for erosion-retarding seeding. One hundred and twenty-four thousand nine hundred and twenty linear feet of diversion ditches have been completed to further the gully control projects.

All in all, a drainage area of 14,-
 $784\frac{1}{2}$ acres, threatened with total destruction by active gullyling, have already been saved

for future generations of Tar Heel farmers by the rescue work of the Soil Conservation Service.

The crews are also working on forest stands on the farms under agreement. Altogether, 8,010.32 man-days have been expended in planting 1,935.82 acres to trees and 702.-52 acres to shrubs.

Seed collection, with a total of 18,395.46 man-days, has also played an important part in the Soil Conservation Service's forestry work. Already, 107,715.92 pounds of hardwood seeds and 7,306.75 bushels of conifers have been collected.

Further work along this line has been in curbing the hazard of fire. Three hundred and twenty-eight and a half man-days have already been expended in the work of fire control. Thirty-one fires have been put under control with the minimum of damage and loss and 525.70 acres of timber land have been treated for fire hazard reduction.

This is the record to date on the North Carolina farms that have been put under agreement. However, it is just the beginning of the reclamation work. For, up to the end of February, 7,672 invitations have been received from farmers to make agreements with the Soil Conservation Service that will bring to them the benefits of this soil erosion control work.



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DEPARTMENT OF AGRICULTURE
Soil Conservation Service

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